

1. A calibration medium for UV absorbance detectors;
comprising:

a rare-earth dopant therein; and

wherein constituents of the gel-sol glass monolith are selected so the rare-earth doped sol-gel glass monolith exhibits a transmittance in the far UV range so spectral features of the rare-earth dopant in the far UV range are discernable.

2. The calibration medium of claim 1, wherein the rare-earth dopant selected exhibits spectral features in the range of from about 220nm to about 700nm.

3. The calibration medium of claim 2, wherein the rare-earth dopant selected exhibits at least one distinct spectral feature in the range of from about 220nm to about 300nm.

4. The calibration medium of claim 1, wherein the rare-earth dopant comprises atoms of erbium.

5. The calibration medium of claim 1, wherein a concentration of the rare-earth dopant in the ⁵⁰¹⁻⁹⁶¹~~gel-sol~~ glass monolith is in the range from about 6% to about 10%.

6. The calibration medium of claim 1, wherein a concentration of the rare-earth dopant in the sol-gel glass monolith is selected so a good contrast between far UV spectral features of

the dopant and background light is exhibited by the calibration medium.

u 7. The calibration medium of claim ³⁷1, wherein the ^{sol-gel}~~gel-sol~~₁ glass monolith exhibits a transmittance of about 50% at about 250nm.

u 8. The calibration medium of claim 5, wherein the ^{sol-gel}~~gel-sol~~₁ glass monolith is a gel-sol silica glass monolith.

9. The calibration medium of claim 8, wherein the rare-earth dopant is erbium nitrate.

u 10. The calibration medium of claim ³⁷1, wherein the rare-earth doped ^{sol-gel}~~gel-sol~~ glass monolith is made by mixing a slurry (sol) including silica, casting the sol into a rough final desired shape, solidifying the sol to produce a gel, aging the gel, drying the gel to remove the liquid phase, densifying the dried gel and doping at least one of the slurry or the gel with the rare-earth dopant.

11. The calibration medium of claim 10, wherein mixing includes adding the rare-earth dopant to the slurry being mixed.

12. The calibration medium of claim 10, further including impregnating the dried gel with the rare-earth dopant.

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13. The calibration medium of claim 10, wherein aging, drying and densifying are performed under conditions that yield at least a type IV (porous) gel-silica base glass monolith.

14. The calibration medium of claim 10, wherein each of aging, drying and densifying are performed at a temperature that is about 900°C or less.

15. The calibration medium of claim 10, wherein doping includes doping with a material including atoms of erbium.

16. A method for calibrating UV absorbance detectors having a spectral light source and a sensor assembly, the calibration method comprising the steps of:

providing a calibration medium including:

a gel-sol glass monolith;

a rare-earth dopant therein; and

wherein constituents of the gel-sol glass monolith are selected so the rare-earth doped sol-gel glass monolith exhibits a transmittance in the far UV range so spectral features of the rare-earth dopant in the far UV range are discernable;

disposing the calibration medium so as to be in a light beam between the light source and the sensor assembly;

sensing the radiation passing through the calibration medium, including radiation in the far UV region;

identifying spectral features of the radiation including features in the far UV region; and

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wherein the step of sensing includes simultaneously and separately sensing in a plurality of bandpasses the radiation passing through the calibration medium, including radiation in the far UV region; and

wherein the step of establishing includes establishing a relationship between each of the plurality of bandpasses of the sensor assembly and each wavelength bandpass being sensed by the detector.

19. The UV absorbance detector calibration method of claim

wherein the rare-earth dopant in the calibration medium being provided exhibits spectral features in the range from about 220nm to about 700nm;

wherein said step of identifying includes identifying spectral features exhibited by the calibration medium and the light source; and

wherein said step of establishing includes establishing a relationship using the identified spectral features exhibited by the calibration medium and the light source.

20. The UV absorbance detector calibration method of claim

19,

wherein the calibration medium being provided includes atoms of erbium and exhibits at least a spectral feature at about 257nm;

wherein said step of identifying includes identifying at least the spectral feature exhibited at about 257nm; and

wherein said step of establishing includes establishing a relationship for the far UV region using the identified spectral feature at about 257nm.

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21. A method for making a UV absorbance detector calibration medium comprising the steps of:

mixing a slurry (sol);
casting the sol into a rough final desired shape;
solidifying the sol to produce a gel;
doping at least one of the slurry or the gel with rare-earth atoms that exhibit at least one distinct spectral feature in at least the far UV range;
aging the gel;
drying the gel to remove the liquid phase; and
densifying the dried gel to yield an medium that exhibits at least an optical transmittance in the far UV range so each spectral feature of the rare-earth dopant in the far UV range is discernable.

22. The method of claim 21, wherein the step of mixing includes adding the rare-earth dopant to the slurry being mixed.

23. The method of claim 21, wherein the step of doping includes impregnating the dried gel with the rare-earth dopant.

24. The method of claim 21, wherein the steps of aging, drying and densifying are performed under conditions that yield at least a rare-earth doped type IV (porous) gel-silica base glass monolith.

25. The method of claim 21, wherein the steps of aging, drying and densifying are performed at a temperature that is about 900°C or less.

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26. The method of claim 21, wherein the step of doping includes doping with a rare-earth atoms exhibiting a spectral features in the range from about 220nm to about 700nm.

27. The method of claim 21, wherein the step of doping includes selecting a concentration of the rare-earth dopant in the range from about 6% to about 10%.

28. The method of claim 21, wherein includes selecting a concentration of the rare-earth dopant so the medium exhibits a good contrast between each far UV spectral feature and background light.

29. The method of claim 21, wherein the steps of aging, drying and densifying are performed under conditions so the medium exhibits a transmittance of about 50% at about 250nm.

30. The method of claim 21, wherein the rare-earth dopant includes atoms of erbium.

31. The method of claim 21, wherein the step of doping includes doping with erbium nitrate.

32. The method of claim 21, wherein the step of drying includes the steps of heating the aged gel in a mid to high humidity environment and then in a low humidity environment.

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33. A UV absorbance detector comprising:

a spectral light source;

a sensor assembly;

a calibration medium that includes:

a gel-sol glass monolith;

a rare-earth dopant therein, the rare-earth dopant exhibiting at least one distinct spectral feature in at least the far UV range; and

wherein constituents of the gel-sol glass monolith are selected so the rare-earth doped sol-gel glass monolith exhibits a transmittance in the far UV range so each distinct spectral feature of the rare-earth dopant in the far UV range is discernable.

34. The calibration medium of claim ³⁵~~33~~, wherein the rare-earth dopant comprises atoms of erbium.

35. The calibration medium of claim ³⁵~~33~~, wherein a concentration of the rare-earth dopant in the sol-gel glass monolith is selected so a good contrast between far UV spectral features of the dopant and background light is exhibited by the calibration medium.

36. The calibration medium of claim ³⁵~~33~~, wherein the gel-sol glass monolith exhibits a transmittance of about 50% at about 250nm.

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